Current Projects:

- Demonstration of the Top Dry System as the Most Energy Efficient Method of Drying Grain for Alabama – Auburn University (Project manager, Dr. Edward Sikora)

  All the expense and effort of making a crop can be wasted if inadequate attention is paid to drying and storage. This grain-drying project will demonstrate the energy efficiency and profitability of a new drying system technology to farmers and other agriculture professionals throughout the state. The new technology is commercially available and affordable, and is approximately 25% more energy efficient compared to conventional drying systems. The impact of this project on agriculture energy efficiency in Alabama can be significant as the technology being demonstrated is available for grain-drying operations for both small scale farmers and large grain dealers.

  Auburn University, with the cooperation of Dee River Ranch in Aliceville, Alabama, will install a Top Dry Bin system and will demonstrate the use of the system for drying down both corn and soybeans. The four-year project will include educational field days and the dissemination and distribution of operational and energy consumption data.

- Use of Oxygen Monitoring Equipment to Reduce Energy Costs and Improve Efficiency – Auburn University Department of Fisheries and Allied Aquacultures (Project manager: Dr. William Daniels)

  Alabama's aquaculture industry is dominated by catfish production, and this particular industry is currently under tremendous pressure from increased imports and costs. The catfish industry is critical to the economic viability of many communities in Alabama. The overall economic impact is approximately $300 million. Catfish pond production costs and efficiencies are dependent upon aeration, and aeration is a major source of electrical usage, thus, one way to reduce production costs is through efficient use of aeration.

  Auburn University will establish several demonstration sites at both Auburn and in west Alabama to demonstrate various commercially available automated oxygen monitoring systems. Workshops will be held to demonstrate the systems, and access to the demonstration sites will be open year round for the two-year study.

- Light Bars: Reducing Time in the Field and Overlap – Auburn University, Alabama Cooperative Extension System (Project manager: Shannon Norwood)

  Global Positioning System (GPS) guidance systems, such as light bars, allow farmers to apply inputs to crops more accurately and as a result, reduce fuel consumption and decrease chemical costs. Light bar systems consist of a GPS antenna, GPS receiver, a guidance display, and a controller. The GPS antenna collects GPS signals, and is mounted on top of the tractor cab with as clear a view of the sky as possible. The GPS antenna sends the signals it collects to the GPS receiver, which interprets them as an actual location (latitude and longitude). The receiver then relays the location to the light bar, which creates an accurate

navigation path thus reducing or eliminating overlap. When overlap is reduced, the number of trips through the field is reduced resulting in a decrease in both fuel and chemical usage.

Alabama Cooperative Extension System (ACES) personnel will install light bars on five row crop farms strategically located across the state to evaluate fuel reduction and to introduce farmers to precision agriculture technology. Information concerning this project will be disseminated to the farming community through newsletters and group tours.

- Biodiesel: Introducing Renewable Energy to North Alabama Farmers – Auburn University, Alabama Cooperative Extension System (Project manager: Mark Hall)

  Alabama farmers use 12,053,500 gallons of diesel fuel each year to produce 1,340,000 acres of row crops that include corn, cotton, peanuts, wheat and soybeans. Increased demand for biodiesel will increase the demand for the vegetable oils biodiesel is made from. These oils come form soybeans, corn, peanuts and cottonseed.

  ACES will supply 16 row crop farmers with biodiesel storage tanks, pumps, flow meters and 500 gallons of biodiesel. They will blend this biodiesel with petroleum diesel in rates ranging from 2% to 20%. Program participants will provide energy usage and acreage documentation and evaluation and host tours.

- Central Alabama Field Crop Efficient Energy Utilization and Soil Quality Preservation with Conservation Tillage – Auburn University, Alabama Cooperative Extension System (Project manager: Leonard Kuykendall)
  Many Central Alabama cotton growers have adopted conservation tillage practices in the last five years; however, very few corn and almost no small grain growers have employed minimum tillage. This project, developed by ACES, will involve the cooperation of farms from Autauga, Chilton, and/or Elmore Counties to demonstrate the potential energy and dollar savings of conservation tillage for small grain growers.

  Conservation tillage eliminates between five and seven tillage operations, each of which consumes approximately one gallon of fuel per acre. Although deep tillage consumes between two and three gallons per acre, a change to conservation tillage can net a minimum savings of six gallons of fuel per acre which translates into a $9 per acre savings in fuel costs at $1.50 per gallon.

- Demonstration of an Energy-Efficient Aeration Setup for Small-Scale Inland Shrimp Farming – Tuskegee University (Project manager: Dr. Barrett Vaughan)

  Inland shrimp farming is emerging as a viable form of agriculture (or aquaculture) in Alabama. Finding ways for these innovative farmers to save energy costs and increase profits helps insure shrimp farming's future in the state.

  In aquaculture, the electrical cost for aeration is one of the largest continuous expenditures for the producer. The aeration of a shrimp pond is essential because the oxygenation affects the size, quality, and health of the shrimp. Without it, the shrimp would simply die.

This project will showcase energy-efficient aerators that not only ensure a quality product, but also, provide energy savings that significantly impact the producers' profit margin. The demonstration will be conducted at the Tuskegee University Aquacultural Experiment Station at Jackson Aquafarms in Hayneville, Alabama, and will encompass the two growing seasons (March to November) in 2004 and 2005.

- Demonstration of Pellet Furnace and Use of Biofuel Pellets as an Energy-Efficient Heating Source – Auburn University (Project manager: Dr. Oladiran Fasina)

  This two-year project will involve the installation of a biofueled furnace to heat a greenhouse on the Auburn University campus. Pellets made from switchgrass and poultry litter will be used to fuel the furnace. The use of biofuel pellets not only helps to create a market for energy crops such as switch grass, but also, can help to solve the soil and water pollution problems caused by the generation and storage of poultry litter. Other applications for biofueled pellet furnaces include residential buildings, poultry houses, manufacturing shops, and warehouses.

- Demonstrating BioOil Production and BioOil-fueled Heaters for Poultry Houses – Auburn University (Project manager: Dr. David Bransby)

  Rising energy costs are a serious threat to Alabama's $8 billion poultry industry. By using a poultry litter-derived fuel to heat their poultry houses producers can lower their heating costs and at the same time create a new market for the litter.

  BioOil is produced through a relatively simple, environmentally friendly continuous *Advanced Fast Pyrolysis Biorefinery Process* to convert virtually any biomass resource into gases and vapors that are then condensed to create fuel. The BioOil fuel has an energy content of roughly 80,000 Btu per gallon (similar to ethanol). The BioOil produced for this project will be derived from poultry litter and hay.

  In addition to the BioOil fuel produced for farm use, the BioOil production process separates and concentrates the nutrients from the poultry litter into an ash that can be sold and used as fertilizer. The ash co-product is five times less expensive to haul than raw litter, making it much more feasible for shipment to other regions that are deficit in these nutrients.

- Demonstration of Energy Cropping Practices to Improve Energy Efficiency on Farms in Alabama – Alabama Department of Agriculture and Industries (Project manager: Glen Zorn)

  This project, directed by the Department of Agriculture and Industries, will utilize consultants from Auburn University to establish demonstration plantings of several energy crops at various locations in the state including the Department of Corrections' Fountain Farm near Atmore and Red Eagle Farm near Montgomery. The difference in the energy efficiency of the cropping practices necessary for these crops and those involved with the traditional production of corn, cotton and soybeans will be demonstrated as well as how they can sustain productivity and economic returns. The energy crops to be planted include forage

sorghum, pearl millet, velvet bean, forage soybeans, switchgrass, bahia grass, and rye. With cooperation from Alabama Power Company the co-firing of these crops with coal to produce electricity will also be demonstrated.

- Poultry House Distributed Generation Using Recycled Vegetable Oils – Auburn University (Project manager: Dr. Timothy McDonald)

  Energy costs are usually the largest single out-of-pocket expense for poultry growers in our state. This project will demonstrate how growers can produce their own electricity to significantly decrease their energy costs, while at the same time they are creating a new market for the oils produced from Alabama peanuts and soybeans.

  The two-year project, directed by the Department of Biosystems Engineering at Auburn University, will demonstrate the use of a diesel-based induction electric generator operated using recycled restaurant cooking oils to produce supplemental electrical power at a poultry house. In addition to the production of economical electrical power for the poultry farmer, the use of recycled vegetable oils reduces the amount of waste oil that is traditionally sent to landfills or processed in our wastewater treatment plants.